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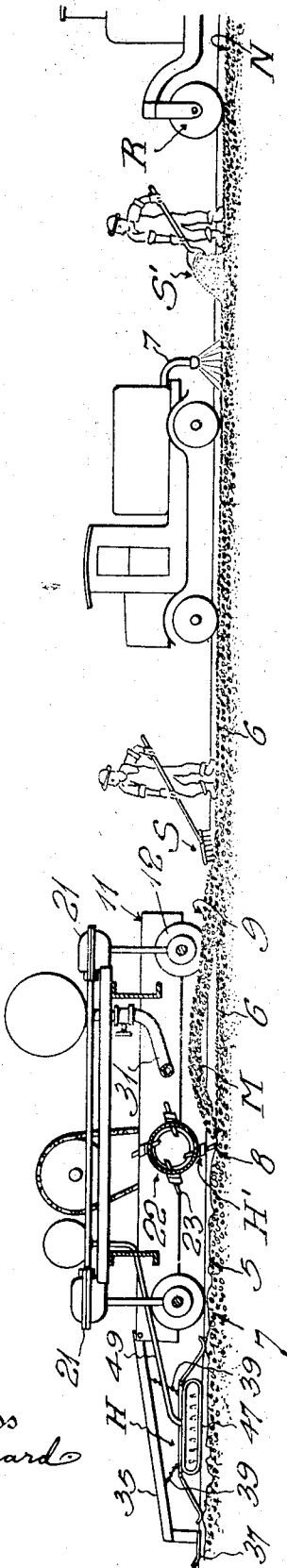
2,053,709

ROAD RECONDITIONING METHOD AND MACHINE

Filed May 24, 1934

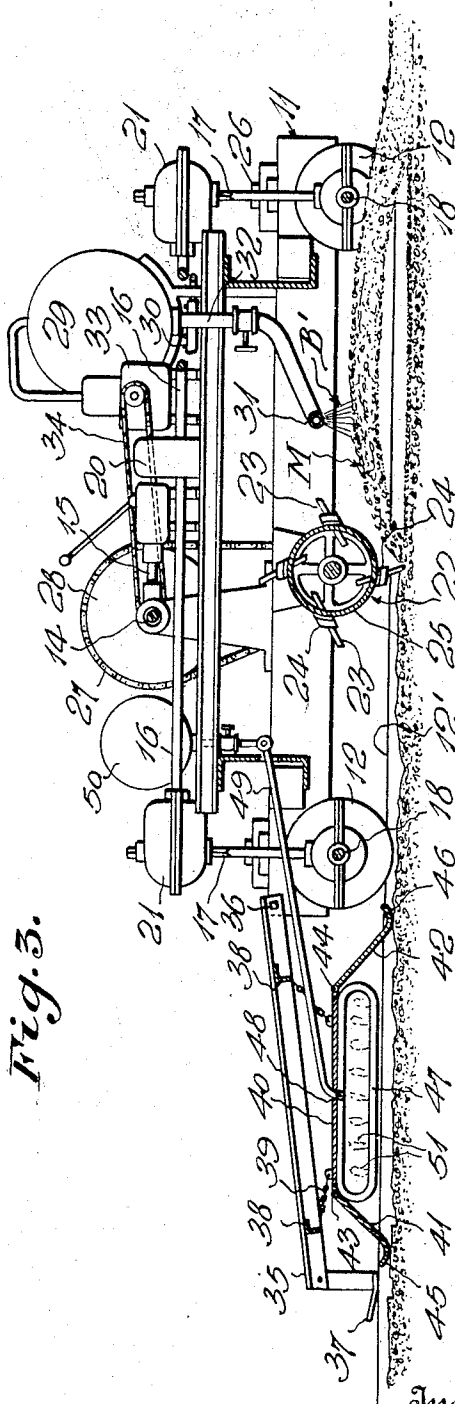
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Fig. 1.



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Fig. 3.



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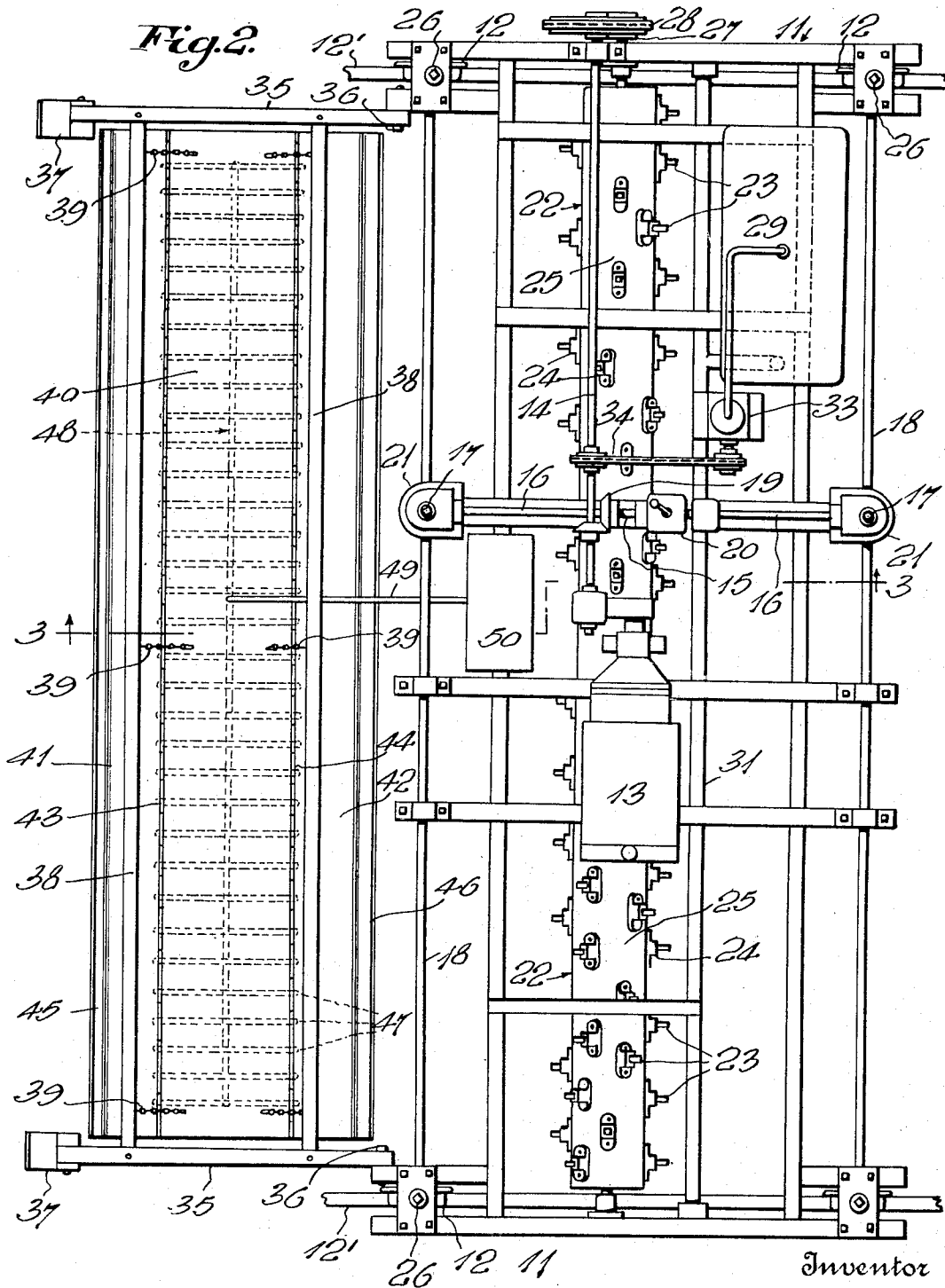
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UNITED STATES PATENT OFFICE

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ROAD RECONDITIONING METHOD AND MACHINE

Benjamin H. Flynn, Alexandria, La.

Application May 24, 1934, Serial No. 727,367

5 Claims. (Cl. 94—39)

This application is a continuation in part of my U. S. application Serial No. 692,880, filed October 9, 1933.

The invention relates to the reconditioning of gravel roads, asphalt roads, bitulithic roads, etc., after the surfaces thereof have become so rough and/or undulatory that even the most careful resurfacing in the customary ways will not restore them to the smoothness required. When roadways reach this condition, it is customary to scarify or plow up the entire road bed and reconstruct the road, but in so doing, not only is great expense incurred, but compaction produced by years of use and settling, is lost, and the new road bed is subject to the same uneven compaction and settling as the old, which will in time destroy its smoothness. It is the object of my invention, however, to provide for effectively reconditioning the surfaces of roads which have become rough and/or undulatory, without disturbing anything but the surface material, and moreover to provide for re-use of this material.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawings.

Fig. 1 is a diagram showing the preferred method steps used in reconditioning a bitulithic or similar road in accordance with the invention.

Fig. 2 is a top plan view showing one machine which may be used in carrying out the method.

Fig. 3 is a vertical transverse sectional view on line 3—3 of Fig. 2, showing in addition to the machine structure that the surface material hewn off from the road surface may be sprayed with a binder while it is being thrown rearwardly through the air.

In the preferred way of practicing the invention, particularly on bitulithic and similar roads having a thermo-plastic or similar binder, I first heat the road surface to from 125° to 150° F., as illustrated at H in Fig. 1, thereby preparing the surface material for disintegration and for subsequent reception of fresh binder. I then hew off as at H', the old road surface 5 to a depth determined by its condition, thereby establishing an accurate sub-surface 6 upon the original road-bed 7, but I do not disturb this bed which has become thoroughly compacted and settled by use. In hewing off the old surface, a myriad of small chisel-like cuts 8 are made to effectively disintegrate the old surface ma-

terial and render it fit for further use. This disintegrated material 9 is spread, for instance, as indicated at S, upon the newly formed sub-surface 6, is then sprayed with cut-back asphalt or other suitable binder as denoted at B, is then sprinkled with sand and/or fine gravel by brushing said sand and/or gravel onto the material or otherwise applying it as indicated at S', and the road is then finally rolled as indicated at R, providing a new smooth surface N.

The old surface is violently hewn off in small fragments by downwardly and rearwardly directed blows, and under the influence of these blows, the fragments are thrown rearwardly through the air and scattered upon the newly formed sub-surface 6. If the old road surface be in such condition that it is not necessary to further spread or smooth the hewn off material M, the fragments of the latter may be sprayed with a binder B' while said fragments spin, whirl, etc. in the air during the rearward throwing and scattering thereof. Application of the binder to the warm fragments during their travel, insures that said fragments shall be effectively covered to produce a well bonded new surface for the completely reconditioned road. Whenever the road is in such condition as to require the hewn off material M to be smoothed or further spread, and this is usually the case, the spraying on of binder is effected after such further spreading or smoothing. In either instance, when the sand and/or gravel is/are spread upon the binder-coated disintegrated material and the whole rolled, such sand and/or gravel will become effectively united with the coated fragments, producing an excellent surface tenaciously bound to the old road-bed and more solidly supported than the original surface, due to the already settled and compact condition of the old bed. The reconditioned road-bed will therefore be more lasting and less liable to weaken and/or become wavy.

The machine which I have illustrated is well adapted for performing the hewing, spreading and binder-applying operations. This machine possesses a frame 11 of a width to extend across a road to be reconditioned, said frame having wheels 12 to travel upon tracks 12' laid temporarily. Upon the frame 11, a clutch-equipped gas engine or the like 13 is mounted, and by means of shafting 14, 15, 16, 17 and 18, gearing 19, and transmissions 20 and 21, or other desired driving connections, said engine drives the wheels 12 to propel the machine along the road.

A transverse rotary cutter 22 is mounted on the

frame 11 and includes a plurality of cutting teeth 23 for hewing off and disintegrating the old road surface, forming the accurate sub-surface 6, and rearwardly throwing and scattering the disintegrated material onto said sub-surface. The teeth 23 are radially adjustable in clamps 24 carried by a heavy drum 25 which constitutes the body of the cutter 22, and said teeth may therefore be readily adjusted to suit the crown of the road.

10 In the present showing, the cutter 22 is not vertically adjustable upon the frame 11, and to raise or lower said cutter, said frame is raised or lowered upon the wheels 12, suitable means 26 being provided for this purpose. It is to be understood however, that the cutter could well be mounted for vertical adjustment with respect to the frame if desired, instead of providing for vertically adjusting said frame.

For driving the cutter 22, I have shown sprockets 27 and a chain 28, operatively connecting said cutter with the shaft 14. Other adequate provision however, could well be made for driving the cutter.

Mounted on the frame 11 is a tank 29 to contain the binder, and a burner 30 may be provided for heating said tank if the binder used requires such heating. A spray pipe or other adequate spraying means 31 is carried by the frame 11 in position to spray the binder upon the disintegrated surface material as it is thrown rearwardly by the cutter 22, and valved piping 32 connects said spray means with the tank 29. Preferably, an air compressor 33, driven by a chain 34 from shaft 14, or in other desired way, is provided to supply air under pressure to tank 29 to facilitate the discharge of binder therefrom and to effect forcible spraying of said binder onto the disintegrated material.

The road-heating means in advance of the parts of the machine above described, may be of any appropriate type for applying any suitable heating medium to raise the road surface to the required temperature, and said road-heating means may be discontinued or lifted whenever it is necessary to stop the machine, preventing excessive heating and melting of the road-way.

In the present disclosure, two vertically swingable bars 35 extend forwardly from the frame of the machine and are pivoted at their rear ends to said frame as shown at 36, the front ends of said bars being provided with skids 37 to travel along the road. The bars 35 are connected by two transverse bars 38 to which chains 39 are anchored, these chains being connected to the top 40 of a hood. Hood front and rear walls 41 and 42 are preferably pivoted at 43 and 44 respectively to the front and rear edges of the top 40, the lower edges of said walls being shaped to provide skids 45 and 46. Within the hood, is a burner composed of a plurality of continuous fuel-heating pipes 47 which are fixedly mounted in any suitable way, the upper reaches of said pipes being secured to a header pipe 48 to which a supply pipe 49 leads from a suitable liquid fuel tank 50 on the frame of the machine. The lower reaches of the continuous pipes 47 are provided with discharge perforations and when the burners are ignited, jets of flame 51 are produced. The heat from the flame is concentrated by the hood onto the roadway and the latter may be heated to the desired temperature as rapidly as the machine advances. The front and rear walls 41 and 42 of the hood may be swung upwardly when it is necessary to stop the machine so that

too much heat will not at that time be concentrated on the roadway, or the arms 35 may be raised, bodily raising the whole heating means, or the fuel supply may be cut off.

It will be seen from the above that I have made unique provision for reconditioning roads whose surfaces have become rough and/or undulatory. In actually practicing the invention upon an old bituminous asphalt road, the old surface material was hewn off to provide a smooth sub-surface, and the material so disintegrated was almost in the same condition as that of cold mixed asphalt top when the latter is first spread. This disintegrated material, replaced and rolled, provided for a smooth, new road surface. Also, a badly worn out bitulithic roadway has been successfully reconditioned with the invention and engineers and various others who have inspected the finished job have considered the road much better than the original road was when new.

If the temperature of the road be sufficiently high, it will not be necessary to further heat it. However, working the road at from 125° to 150° F. if the roadway be provided with a thermoplastic binder such as asphalt, allows much easier hewing off of the old surface without the formation of a large amount of dust to interfere with proper bonding of the new surface to the old bed.

While excellent results may be obtained from the specific method steps and machine structure herein disclosed, it is to be understood that variations may be made within the scope of the invention as claimed, and that the present disclosure is therefore illustrative rather than limiting.

I claim:

1. In a method of reconditioning a gravel, asphaltic or similar hard surface road, the steps of so delivering hewing blows to the surface material of said road as to disintegrate the old surface material and establish an accurate surface on the pre-settled and pre-compacted road bed, confining said blows to such directions and delivering them with such force as to throw the disintegrated surface material over the newly formed accurate surface of the road bed, spraying a binder onto said thrown disintegrated surface material before it comes to rest to coat all sides of the fragments, and compacting the coated disintegrated material on said accurate surface of the road bed.

2. In a method of reconditioning a gravel, asphaltic or similar hard surface roadway having a thermo-plastic or similar binder, the steps of heating the surface material to prepare it for disintegration and subsequent reception of binder, so delivering hewing blows to the heated surface material as to disintegrate the same and form an accurate surface on the pre-settled and pre-compacted road bed, confining said blows to such directions and delivering them with such force as to throw the warm disintegrated surface material over the newly formed surface of the road bed, spraying a binder upon said thrown warm disintegrated surface material before it comes to rest to coat all sides of the warm fragments, and compacting the coated disintegrated material on said accurate surface of the road bed.

3. A road reconditioning machine comprising a mobile frame and means for propelling it along a road, power-driven means mounted on said frame for rotatively hewing the old surface from the road, disintegrating the old surface material and rearwardly scattering it onto the road, said power-driven means having a plurality of chisel-

like teeth each of a width infinitesimal with respect to the width of the road, and means mounted on said frame for applying a binder to the disintegrated material while it is being rearwardly scattered.

5 4. A road reconditioning machine comprising a mobile frame and means for propelling it along a road, a transverse rotatably mounted cutter on said frame having longitudinally spaced chisel-
10 like teeth for hewing off the old road surface, means for rotating said cutter in a direction to cause the teeth at the lower side thereof to move rearwardly, causing said teeth to rearwardly scatter the hewn off fragments through the air onto
15 the road, a tank mounted on said frame to contain a binder, spray means mounted on the frame in position to discharge the binder onto the rearwardly scattered fragments of surface material while said fragments are in the air to coat all sides
20 of said fragments, and means for conducting the binder from said tank to said spray means.

5. In a machine for reconditioning gravel asphaltic or similar hard surface roadways having a thermo-plastic or similar binder, a mobile frame, means at the front of said frame for heating the surface material of the roadway to prepare it for disintegration and for subsequent
10 reception of binder, power-driven means on said frame behind said heating means for hewing off and disintegrating the warm surface material and leaving an accurate surface on the road bed,
15 said power-driven means being driven downwardly and rearwardly at such speed as to rearwardly scatter the warm disintegrating surface material over the newly formed surface of the road bed, and means on said frame behind said power-
20 driven means for spraying a binder upon the warm rearwardly thrown disintegrated material before it comes to rest, to coat all sides of the fragments.

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